



APRIL 2017

SPACE LAUNCH SYSTEM HIGHLIGHTS

**SLS CORE STAGE
ENGINE SECTION
TEST ARTICLE
ON THE MOVE**

SLS CORE STAGE ENGINE SECTION TEST HARDWARE SHIPS FROM MICHLOUD TO MARSHALL



ROLLIN' ON THE RIVER: NASA'S BARGE PEGASUS

Pegasus was modified to transport the **LARGEST ROCKET STAGE IN THE WORLD**—the Space Launch System (SLS) Core Stage. The barge's first trips will ferry Core Stage test articles.



The SLS Core Stage measures **212' LONG & 27.6' DIAMETER**

AFT
(REAR)

BARGE PEGASUS





FORE
(FRONT)

310' LONG & 50' WIDE



FOUR TEST ARTICLES are being transported to NASA's Marshall Space Flight Center for a series of critical structural tests that simulate the forces experienced during flight

CORE STAGE TEST ARTICLES

-  **ENGINE SECTION (MINUS ENGINES)**
-  **LIQUID HYDROGEN (LH₂) TANK**
-  **LIQUID OXYGEN (LOX) TANK**
-  **INTERTANK**

Pegasus is a self-sustaining vessel except for propulsion, which comes via

2 TUGBOATS
(ONE PUSHES AND ONE PULLS)

From NASA's Michoud Assembly Facility—America's rocket factory in New Orleans—to Marshall Space Flight Center in Huntsville, Alabama, Pegasus travels

1,240 MILES BY RIVER

After being built at NASA's rocket factory — Michoud Assembly Facility, near New Orleans — the SLS core stage engine section structural test article set sail up the mighty Mississippi River. Its ride for the 1,240-mile trip: NASA's barge Pegasus, recently refurbished to transport the SLS core stage, and now as long as a football field!



Its destination: NASA's Marshall Space Flight Center, where the engine section test article will begin structural testing later this year. A new test fixture will apply loads that simulate the forces of launch — the core stage pushing down, engines pushing up and solid rocket boosters pulling at the engine section from both sides.

Read the full story:
bit.ly/2p14FY2



VIRTUALLY LAUNCHING AT THE 33rd SPACE SYMPOSIUM



At the 33rd Space Symposium, April 3-6 in Colorado Springs, Colorado, NASA's Exploration Systems Development exhibit thrilled attendees, who experienced a 360-degree virtual tour of SLS and Orion on the launch pad at Kennedy Space Center — all while comfortably seated! More than 8,000 Space Symposium attendees visited the NASA exhibit.



INTEGRATED STRUCTURAL TEST COMPLETES QUALIFICATION TESTING

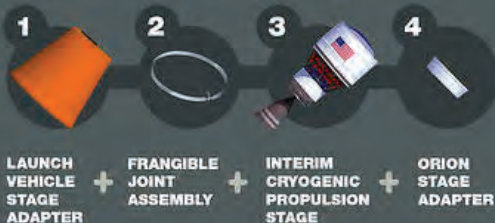
An Integrated Structural Test of the upper part of the rocket has recently finished qualification testing at Marshall Space Flight Center. The test series pushed and twisted four structural test articles that simulate the launch vehicle stage adapter, a frangible joint separation assembly, the interim cryogenic propulsion stage and the Orion stage adapter — all of which are positioned between the SLS core stage and the Orion spacecraft. Applying stringent conditions to the test articles helps verify their structural capabilities, so engineers know the hardware will perform as predicted during demanding missions. More than 50 test cases, measuring the effects of various types of loads on the structures, were completed for the test series. After engineers analyze the data, the hardware will be qualified for first flight.

UNDER PRESSURE!

WHAT'S BEING TESTED AND HOW DO WE TEST IT?

THE INTEGRATED STRUCTURAL TEST IS SLS'S FIRST MAJOR STRUCTURAL TEST QUALIFYING

4 INTEGRATED TEST ARTICLES:

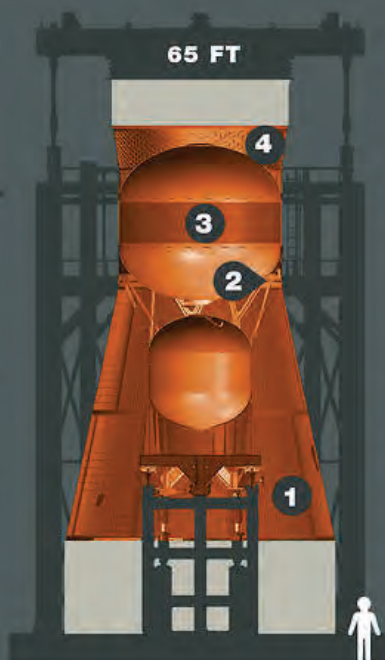


WHAT'S THE OBJECTIVE?



THIS TEST WILL VERIFY THAT EACH TEST ARTICLE CAN WITHSTAND THE EXPECTED FORCES OF FLIGHT.

THE TEST ARTICLES ARE FIRST STACKED JUST AS THEY WILL BE ON THE ROCKET, BETWEEN THE CORE STAGE AND THE ORION SPACECRAFT. THE TEST THEN SIMULATES THE TYPES OF PHYSICAL LOADS THIS ENTIRE SECTION OF THE ROCKET WOULD BE EXPECTED TO ENCOUNTER IN FLIGHT:



3000+ BOLTS

HOLD THE TEST ARTICLES AND SIMULATORS TOGETHER TO ENSURE THE VEHICLE IS SECURELY STACKED.

28 PISTONS APPLY PHYSICAL FORCE TO THE STACK:

FORCES AND PRESSURES ARE APPLIED TO TEST ARTICLES AT LOADS

40% ABOVE FLIGHT.

100+ MILES

OF CABLES TRANSMIT THE MEASUREMENTS FROM 1900 DATA CHANNELS.

GOT FUEL?

INSTEAD OF FUEL, THE LIQUID HYDROGEN AND LIQUID OXYGEN FUEL TANKS ARE FILLED FOR TESTING WITH **NONFLAMMABLE LIQUID NITROGEN (LN2)*** AND THEN PRESSURIZED WITH GASEOUS NITROGEN TO SIMULATE FUELED FLIGHT CONDITIONS SAFELY.

* CRYOGENIC LIQUID NITROGEN AT **-320°F**

#NASASLS www.nasa.gov

LN2

LINING UP FOR SECOND FLIGHT

NASA and its industry partners are one team working on two rockets! Here, technicians at solid rocket boosters prime contractor Orbital ATK line a center forward booster segment case prior to installing insulation for the second flight of SLS and Orion.



NASA AND SLS SHOW OFF AT MAXWELL AIR SHOW

About 60,000 aviation and spaceflight enthusiasts stopped by the NASA and SLS exhibit at the Maxwell Air Show, April 8-9 at Maxwell Air Force Base in Montgomery, Alabama. The day before the Air Show, students from several area schools visited the exhibit and SLS experts spoke to the children about space exploration and the importance of STEM education.

SPACEFLIGHT PARTNERS:

Janicki Industries



NUMBER OF EMPLOYEES: 704

LOCATION:
Sedro-Woolley, Washington

WHAT THEY DO FOR SLS:

Janicki Industries recently completed the diaphragm for the Orion stage adapter, which connects the Orion spacecraft to SLS. The diaphragm within the adapter creates a barrier that prevents hydrogen gas build-up from reaching the Orion spacecraft before and during launch. Janicki Industries also supplies many large flight components made of advanced carbon composites for the Orion Program.

GREETINGS FROM ILLINOIS



NASA's SLS and Orion programs recently recognized industry partner UTC Aerospace Systems of Rockford, Illinois, for the key role the company is playing in building America's deep space exploration system. Formerly known as Hamilton Sundstrand, UTC Aerospace Systems supplies several critical thrust vector control hydraulic components for the SLS core stage, including the core auxiliary power unit, the core auxiliary power unit controller, the hydraulic main pump and the hydraulic fluid accumulator.

FOLLOW THE PROGRESS OF NASA'S NEW LAUNCH VEHICLE FOR DEEP SPACE:

Twitter [Twitter.com/NASA_SLS](https://twitter.com/NASA_SLS)

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COMING UP:

NASA Day in Baton Rouge

Core stage engine section test article arrives at Marshall

Integrated Structural Test finishes

RS-25 engine hot-fire testing